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19
29
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RESEARCH NOTE



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CURRENT SERIAL RECORDS

HARDWOOD LOG GRADING AT CIRCULAR SAWMILLS

Log grading essentially sorts logs into quality groups. Therefore, at a mill where log price is based on quality, the mill's grading system is important to the mill operator, the log supplier, and the timber owner.

Log quality estimates at five circular sawmills in southern Ohio and eastern Kentucky during the summer of 1962 varied greatly by mill graders. This variation affected the amount each mill paid for logs even when they paid the same price per thousand board foot for a given species and log grade.

Study Methods

To evaluate the grading systems used, study logs at each mill were scaled and graded by the log buyer and by a Forest Service check scaler.

The check scaler used the same log rule as the individual log buyer. At all mills the same scaling method, a modification of the method prescribed in the National Forest Scaling Handbook,^{1/} was used by the check scaler. Volume loss from scalable defect was computed using Grosenbaugh's formulas^{2/} for cull percent.

^{1/} U.S. Department of Agriculture. National Forest scaling handbook. Forest Serv. FSH 2443.71, 193 pp., illus. 1963.

^{2/} Grosenbaugh, L. R. Shortcuts for cruisers and scalers. U.S. Forest Serv. South. Forest Expt. Sta. Occas. Paper 126, 24 pp., illus. 1952.

To check a mill log buyer's quality estimates, the study logs were graded independently using the U.S. Forest Service Hardwood Log Grades^{3/} for factory lumber class logs, and the U.S. Forest Service Standard Specifications for Hardwood Construction Logs and the Suggested Specifications for Hardwood Local Use Logs^{4/} for subfactory lumber class logs.

Grading Practices

Although scaling techniques varied among the study mills, at no mill did scaled log volume differ more than 3 percent from that determined by check scale. Therefore, any variation in log quality estimates among mills was attributable primarily to differences in grading practices. Two mill operators used no formal log-grading system but did vary price according to their opinion of quality. At the other three mills formal grading systems were used. One was based on the U.S. Forest Service Hardwood Log Grades and another was based on the Ohio Forestry Association Log Grades.^{5/} The third was a special system developed by the mill operator for his own use.

At the two mills where no formal grading system was used we considered high-priced logs to be Grade 1; medium-priced logs, Grade 2; and low-priced logs, Grade 3.

All the mill graders showed bias in grading logs or estimating log value. For example, graders tended to grade logs of preferred species higher than the same quality logs of a less desired species. In addition, diameter appeared to be far more important to them than the clear log surface in determining log grade or establishing the price to be paid for a log. Mill graders did not differentiate between defects that reduce volume only and defects that degrade as well as reduce volume. As a result, the mill grades they assigned varied widely from those we assigned using the Forest Service Hardwood Log Grades (table 1).

^{3/} Forest Products Laboratory. Hardwood log grades for standard lumber. U.S. Forest Serv. FPL Rpt. 1737, 15 pp., illus. 1959.

^{4/} Ostrander, M. D., and others. A guide to hardwood log grading. U.S. Forest Serv. Northeast. Forest Expt. Sta., 50 pp., illus. 1965.

⁵ Ohio Forestry Association, Inc. Ohio standard saw log grades. 8 pp., illus. 1964.

Table 1.--Comparison of mill log grades with check
grades, by net volume

Mill	:	:	Total	:	Percent of net volume graded...		
	Total	:	net log	:			
	logs	:	volume	:	Lower	Same	Higher
	<u>Number</u>		<u>Board feet</u>				
A ^{1/}	94		7,345		12	75	13
B ^{2/}	90		10,430		13	68	19
C ^{1/}	404		43,701		20	59	21
D ^{3/}	337		24,441		2	54	44
E ^{2/}	239		16,929		3	47	50

^{1/} Mill using adaptation of either the U.S. Forest Service Hardwood Log Grades or the Ohio Forestry Association Log Grades.

^{2/} Mill varying price according to an estimate of quality.

^{3/} Mill grading system developed by operator for own use.

Mill operators using their own grading systems tended to overgrade logs. For example, at mills B, D, and E, 41 percent of total net log volume (51,800 board feet) was overgraded and 4 percent was undergraded--a net overgrade of 37 percent. By contrast, at mills where standard grading was employed, 20 percent of total net log volume (51,046 board feet) was overgraded and 19 percent was undergraded--a net overgrade of 1 percent.

Logs that should be classified separately as "construction," "local use" or "cull" according to specifications for subfactory lumber class logs were generally lumped together by the mill graders.

An indication of the importance of the variation in quality estimates may be obtained by assigning values to the various grades. If, for example, operators at the study mills bought a load of ten Forest Service Grade 2 logs totaling 2,050 board feet, graded them as indicated in table 1, and valued their equivalent of Forest Service Grade 1 logs at \$70.00 per thousand board feet, Grade 2 at \$50.00 per thousand board feet, and Grade 3 at \$30.00 per thousand board feet, these operators would have paid the following amounts for the load:

<u>Grader</u>	<u>Grading method</u>	<u>Value of load</u>
Check grader	U.S. Forest Service	\$102.50
Mill A	Standardized system	102.90
Mill B	Estimate of quality	104.98
Mill C	Standardized system	102.90
Mill D	Operator's own system	119.72
Mill E	Estimate of quality	121.76
All mill average		110.30

Under these conditions a log seller cannot validly compare the board-foot prices paid for logs by different mills unless he adjusts for differences in grading between mills. And the information necessary to make such adjustments is often either not available or, at best, difficult to obtain. A mill operator must make the same adjustments in order to compare his mill log grade and lumber tally with published log-grade, lumber-yield information. Standardized log grading would eliminate the need for such adjustments.

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